

# PE Non-Destructive Testing (NDT)

## How do you define success?

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# Background

- ❖ **GRI R&D Project**

**Objective: Develop an automated ultrasonic system to evaluate butt-fused PE pipes for sizes 2” – 12”**

- ❖ **1983 – General Research Corp.  
Developer**

- ❖ **1988 – McElroy Commercializer**

- ❖ **1995 – Commercially available**



# Market Drivers

- ❖ **Failure investigations**
- ❖ **Quality control (QC) improvements**
  - ◆ **Reliability**
  - ◆ **Integrity**
  - ◆ **Training**
- ❖ **Safety/reliability**
- ❖ **Higher operating pressures**

# Market Drivers

- ❖ **Proposed IDF changes**
- ❖ **Reduce costs**
  - ◆ **New/replacement installations**
  - ◆ **Repairs**

**Improve Reliability and  
Integrity of  
Piping Materials**

# Prototype Development

- ❖ **GRI Distribution Project Advisory Group**
- ❖ **PSE&G involvement ground floor - 1991**
- ❖ **Ultrasonic technology works**
  - ◆ **Improvements made over time**
  - ◆ **Consistent results obtained**
- ❖ **Full range of inspection sizes required**
  - ◆ **Multi-phased approach**
  - ◆ **2" – 12"**
  - ◆ **MDPE**
  - ◆ **HDPE**
  - ◆ **Various pipe manufacturers**

# 1993 Prototype Field Test Results

## ❖ Participants

- ◆ Northern Illinois Gas (MDPE)
- ◆ PSE&G (HDPE)
- ◆ Con Edison (HDPE)
- ◆ Elizabethtown Gas (MDPE)
- ◆ Lone Star Gas (MDPE)

## ❖ 2” – 6” diameter piping

## ❖ All fusions classified correctly

- ◆ Good fusions
- ◆ Bad fusions

# 1993 Marketing Plan

- ❖ **Advertising campaign**
- ❖ **Customer demonstrations**
- ❖ **Plastic pipe symposium paper**
- ❖ **Technology presentations**
  - ◆ **Regional**
  - ◆ **International**

# Fast Forward to 2001

- ❖ **Commercialized by McElroy (1996 – 30 units sold)**
- ❖ **McSnapper test developed**
- ❖ **Enhancements**
  - ◆ **Software**
  - ◆ **Hardware**
- ❖ **\$30-35K equipment cost**
- ❖ **Total units sold approximately 50**
- ❖ **Product discontinued**
  - ◆ **Lack of market penetration**
  - ◆ **Lack of consensus among users**

# So What Happened?

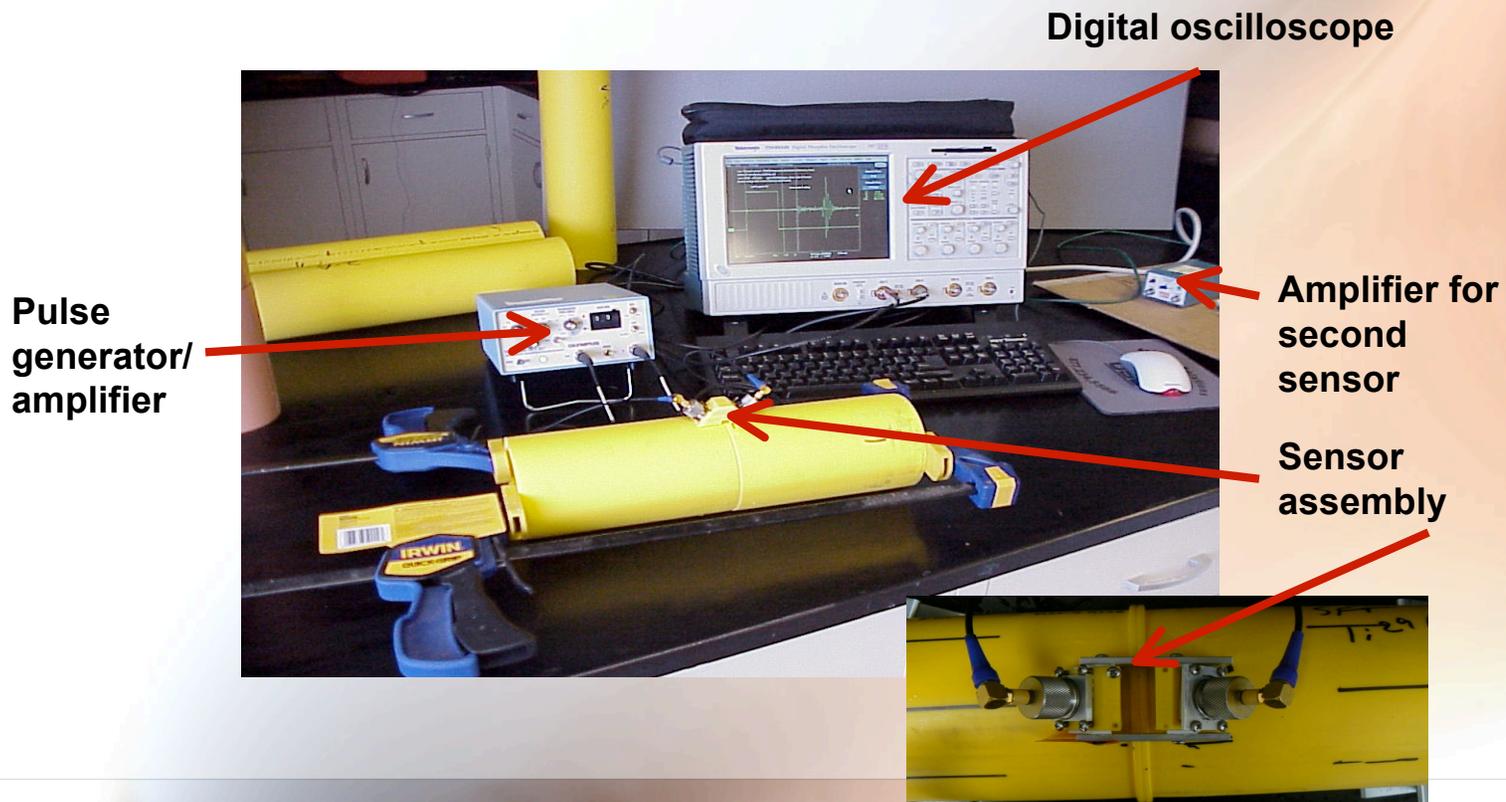
- ❖ **Technical success vs. business failure**
- ❖ **Was industry ready?**
  - ◆ **Skepticism**
  - ◆ **Cost**
  - ◆ **Training/Expertise**
  - ◆ **Technology transfer challenges**
- ❖ **User friendliness questioned**
  - ◆ **Operator interpretation (3<sup>rd</sup> party inspection vs. in-house use)**
  - ◆ **Red light/green light concept**
  - ◆ **Lacking Standards of Acceptability (SOA)**
- ❖ **Industry need accounted for?**

# Challenges/Lessons Learned

- ❖ **Solicit Industry Input**
  - ◆ **Continuous**
  - ◆ **“Right” people**
  - ◆ **Prototype feedback**
- ❖ **Finalize and meet specifications**
- ❖ **Clearly define benefits**
- ❖ **Obtain commercializing partner at right time**
- ❖ **Collective involvement**
  - ◆ **Technology transfer**
  - ◆ **Training**

# Current status (Same market Drivers)

- ❖ PSE&G continues use
- ❖ Ongoing R&D Programs
  - ◆ GTI OTD
    - *Ultrasonics*



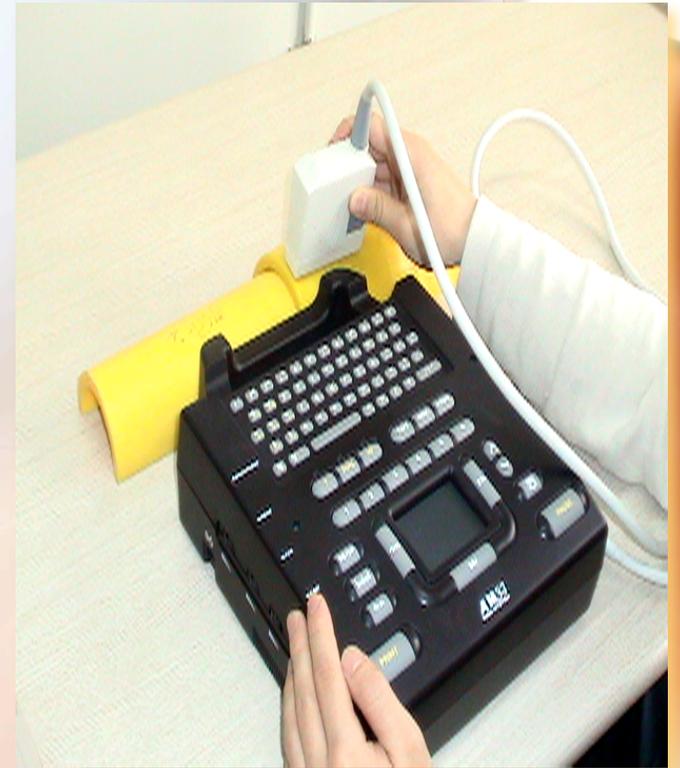
# Current Status

## ◆ NYSEARCH

- *WZIM*
- *Ultrasonic phased array*
- *Microwave*
- *Digital X-ray*
- *Butt fusion integrity*
  - Process improvements
  - Isolate bad joint parameters

❖ **Still need SOA**

❖ **Electrofusion QC**



# Benefits

- ❖ **Enhance fusion operator training**
- ❖ **Enhance QC**
  - ◆ **New facilities**
  - ◆ **Pipe-in-the ground**
- ❖ **Improve safety**
- ❖ **Increase reliability**
- ❖ **Reduce costs**

**Still a quest for  
The Holy Grail**

# Questions